Name:

at1119paper: Complete the Square, $b =$ odd (v513)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 59x = -714$$

Add $\left(\frac{-59}{2}\right)^2$, which equals $\frac{3481}{4}$, to both sides of the equation.

$$x^2 - 59x + \frac{3481}{4} = \frac{625}{4}$$

Factor the left side.

$$\left(x + \frac{-59}{2}\right)^2 = \frac{625}{4}$$

Undo the squaring.

$$x + \frac{-59}{2} = \frac{-25}{2} \quad \text{or} \quad x + \frac{-59}{2} = \frac{25}{2}$$
$$x = \frac{59 - 25}{2} \quad \text{or} \quad x = \frac{59 + 25}{2}$$
$$x = 17 \quad \text{or} \quad x = 42$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 - 37x = -232$$

$$x^2 - 37x + \frac{1369}{4} = \frac{441}{4}$$
$$\left(x + \frac{-37}{2}\right)^2 = \frac{441}{4}$$

$$x + \frac{-37}{2} = \frac{-21}{2} \quad \text{or} \quad x + \frac{-37}{2} = \frac{21}{2}$$
$$x = \frac{37 - 21}{2} \quad \text{or} \quad x = \frac{37 + 21}{2}$$
$$x = 8 \quad \text{or} \quad x = 29$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 - 41x = 230$$

$$x^2 - 41x + \frac{1681}{4} = \frac{2601}{4}$$

$$\left(x + \frac{-41}{2}\right)^2 = \frac{2601}{4}$$

$$x + \frac{-41}{2} = \frac{-51}{2} \quad \text{or} \quad x + \frac{-41}{2} = \frac{51}{2}$$

$$x = \frac{41 - 51}{2} \quad \text{or} \quad x = \frac{41 + 51}{2}$$

$$x = -5 \quad \text{or} \quad x = 46$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 + 11x = 1230$$

$$x^2 + 11x + \frac{121}{4} = \frac{5041}{4}$$

$$\left(x + \frac{11}{2}\right)^2 = \frac{5041}{4}$$

$$x + \frac{11}{2} = \frac{-71}{2} \quad \text{or} \quad x + \frac{11}{2} = \frac{71}{2}$$

$$x = \frac{-11 - 71}{2} \quad \text{or} \quad x = \frac{-11 + 71}{2}$$

$$x = -41 \quad \text{or} \quad x = 30$$